

### **REMARKS**

Reconsideration of this application, as presently amended, is respectfully requested.  
Claims 29-128 are pending in this application. Claims 29-128 stand rejected.

### **Claim Objections**

Claims 46, 59, 79 and 114 were objected to for informalities.

Specifically, with respect to claims 46, 79 and 114, the Examiner notes that the language "...a grouping the segments that represents a component of the structure..." is grammatically incorrect. Claims 46 and 79 have been amended to correct the language objected to by the Examiner. However, it is noted that claim 114 does not include the informality noted by the Examiner, and is grammatically correct. Therefore, claim 114 has not been amended.

Further, claim 59 has been amended to correct a minor typographical error.

In view of the above amendments and remarks, reconsideration and withdrawal of the objection to the claims is respectfully requested.

### **Rejection under 35 U.S.C. § 101**

Claims 29-61, 62-94, 95-127 and 128 are rejected under 35 U.S.C. §101 as being directed to non-statutory subject matter. For the reasons set forth in detail below, this rejection is respectfully traversed.

Initially, it is noted that the USPTO issued *Interim Guidelines for Examination of Patent Applications for Subject Matter Eligibility* on November 22, 2005 (i.e., after the mailing date of

the current Office Action). It is believed that these new guidelines, which assist USPTO personnel in the examination of patent applications, support applicants' position that the present claims recite statutory subject matter. Interestingly, in the first paragraph of the new Interim Guidelines, the USPTO recognizes that the previous guidelines issued in 1996 do not take into account the *State Street Bank & Trust Co. v. Signature Financial Group* ("State Street") and the *AT&T v. Excel Communications, Inc.* ("AT&T") cases decided subsequent to the previous guidelines. State Street and AT&T were cited by applicants in the previous response filed August 5, 2005.

The Examiner's position, as best understood, is that the claims recite an abstract idea and are not limited to practical applications in the arts. The Examiner asserts

None of the claims is limited to practical applications in the arts. Examiner finds that Applicant's specification of a genetic algorithm to map one data structure (parent profile) to another data structure (offspring profile) specifies, simply, an abstract mapping (or an algorithm achieving such a mapping) of one design to another design. This is non-statutory as no post-solution activity is disclosed.

Further, in Item 18, pages 18-19 of the Office Action, the Examiner asserts that the arguments presented in the response filed August 5, 2005, traversing the 35 U.S.C. §101 rejection were not persuasive because

the amendment to claim 29 to clarify that the claimed structure 'is a physical structure' fails to consider that current computers can only *represent* a physical structure and that such a representation is necessarily abstract (i.e., disassociated from any specific instance of a physical structure). To be statutory, something must be done with the representation that is tangible, concrete or practical."

Although the Examiner's reasoning is not entirely clear to applicants, the rejection will be addressed below as best understood. For example, the Examiner concludes "[this] is non-statutory as no post solution activity is disclosed" and "[to] be statutory, *something must be done with the representation* that is tangible, concrete or practical" [emphasis added].

The USPTO guidelines *previously* defined post processing (or post-solution) activity as acts performed outside the computer that result in the manipulation of a tangible physical object and result in the object having a different physical attribute or structure (MPEP §2106). Thus, it appears that the Examiner believes that the evolved parent profile (i.e., offspring profile) must be used somehow to render the claim statutory.

The *Manual of Patent Examining Procedure* (MPEP) §2106 defines post-computer process activity as a "safe harbor" that renders a claim statutory. However, the *State Street* case and the *Interim Guidelines* make clear that although post-solution activity will render a claim statutory, post-solution activity is ***not required to render a claim statutory***. More particularly, the *Interim Guidelines* indicate that the claim is statutory (1) if the claimed invention physically transforms an article or physical object to a different state or thing, (2) ***or if the claimed invention produces a useful, concrete and tangible result***.

Thus, the Examiner's assertions that post-solution activity is required and that something must be done with the result that is useful, concrete and tangible are simply incorrect under the current case law and the current *Interim Guidelines*.

In the Amendment filed August 5, 2005, it was argued, in summary, that (1) the current legal requirement for a claimed process to define statutory subject matter is that the claimed

invention as a whole must produce a “useful, concrete and tangible result,” (2) the offspring profile evolved from the parent profile and representing a new outline for the design, the new outline delineating the new shape of the physical structure, is a “useful, concrete and tangible result” rendering the claims statutory; and (3) the applicants’ specification makes clear that the claimed invention produces a “useful, concrete and tangible” result, and describes, for example, that by decomposing profiles into segments and evolving such profiles, the present invention can enrich the design process with meaningful offspring profiles reflecting various combinations of preferred characteristics of the parent profiles, thus facilitating quick and easy generation of creative concept variations and reducing the overall design time. In summary, the claimed invention evolves an outline for design delineating the shape of a physical structure into a new outline delineating a new shape of the physical structure by dividing the parent profile (i.e., outline representing the shape of a physical structure) into segments and varying at least one dimensional characteristic of at least one of the segments.

Thus, contrary to the Examiner’s assertion, the presently claimed invention is not an “abstract mapping (or an algorithm achieving such a mapping) of one design to another design.” The presently claimed invention produces a new design (i.e., a new outline for the design). Further, it is submitted that the new outline is a useful, concrete and tangible result because it represents a change of the original design that can be used to model a physical structure, such as an automobile, prior to actual production of that physical structure. The new outline for the design is also useful in that it can show a designer what the original design would look like after varying only certain portions (i.e., segments) of the parent profile.

Therefore, it is respectfully submitted that the presently claimed invention produces a useful, concrete and tangible result, and therefore defines statutory subject matter under the new *Guidelines* and under the current case law. Accordingly, reconsideration and withdrawal of the rejection under §101 are requested for at least the above reasons.

It is noted that the Examiner has not specifically addressed why the offspring profile is not considered a “useful, concrete and tangible” result. Therefore, if the rejection is maintained, the Examiner is requested to address this point.

Further, in addition to the above arguments, independent claim 62, which recites a “*computer-implemented genetic design apparatus... comprising...a selection device...a segmentation unit...a genetic evolution unit...*” clearly recites a statutory product claim. Still further, independent claim 95, which recites a “*computer-implemented graphical user interface comprising ... a display...*,” should also be considered a statutory product claim.

Moreover, independent claim 128 recites a “*computer-readable medium encoded with processing instructions...*” As discussed in the MPEP, §2106 (IV)B1(a), the USPTO recognizes “a claimed computer-readable medium encoded with a computer program” as a “computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer’s functionality to be realized, ***and is thus statutory***” [emphasis added].

Accordingly, it is submitted that each of independent claims 62, 95 and 128 define statutory subject matter for these additional reasons.

**Rejection Under 35 U.S.C. § 112, First Paragraph**

Claims 29-61, 62-94, 95-127 and 128 were rejected under 35 U.S.C. §112, first paragraph. For the reasons set forth in detail below, this rejection is respectfully traversed.

The Office Action asserts that the claims are rejected under 35 U.S.C. §112, first paragraph, because “the MPEP ... and current case law require such a rejection if a 101 rejection is given, where the Applicant has not in fact, disclosed the practical application for the invention.” See Items 6 and 7 of Office Action. The Examiner cites the MPEP §2107.01(IV).

Although the rejection under §112, first paragraph, will be overcome when the rejection under 35 U.S.C. §101 (discussed above) is overcome, it is respectfully submitted that the rationale for the §112, first paragraph, rejection is based on incorrect application of current case law and the MPEP, and should therefore be withdrawn. As will be discussed in detail below, the rejection under §112, first paragraph, is improper under the principles discussed in the Manual of Patent Examining Procedure (MPEP) §2107 and current case law.

More specifically, as discussed in the MPEP §2107, as interpreted by the Federal courts, 35 U.S.C. §101 has *two purposes*. First, 35 U.S.C. §101 defines which categories of inventions are eligible for patent protection. An invention that is not a machine, an article of manufacture, a composition or a process cannot be patented. Second, 35 U.S.C. §101 serves to ensure that patents are granted on only those inventions that are “useful.” This second purpose has a Constitutional footing - Article I, Section 8 of the Constitution authorizes Congress to provide exclusive rights to inventors to promote the “useful arts.” Thus, to satisfy the requirements of 35 U.S.C. §101, an applicant must claim an invention that is statutory subject matter and must show

that the claimed invention is "useful" (i.e., has utility) for some purpose either explicitly or implicitly.

The MPEP §2107 indicates that application of this latter element of 35 U.S.C. §101 (i.e., the utility requirement) is the focus of MPEP §2107. ***More specifically, the MPEP and current case law do not support a rejection under 35 U.S.C. §112, first paragraph, when the basis of the 35 U.S.C. §101 rejection is non-statutory subject matter.***

The Examiner relies on the Manual of Patent Examining Procedure (MPEP) §2107.01(IV) to support the §112, first paragraph, rejection. However, MPEP §2107.01(IV) relates to applications that ***fail to satisfy the utility requirement*** of 35 U.S.C. §101. More particularly, MPEP §2107.01(IV) indicates that if the application fails, as a matter of fact, to satisfy the ***practical utility*** requirement of 35 U.S.C. §101, then the application also fails as a matter of law to enable one of ordinary skill in the art to make and use the invention under 35 U.S.C. §112, first paragraph (i.e., the "how to use prong" of §112, first paragraph). In other words, if an application has no utility, then an applicant cannot comply with §112, first paragraph, because compliance requires a description of how to use a presently useful invention. Otherwise, an applicant would anomalously be required to teach how to use an invention that is not useful.

However, the rejection under 35 U.S.C. §101 is not based the present application lacking usefulness or practical utility. Instead, as set forth in Item 5 of the Office Action, the present application has been rejected under 35 U.S.C. §101 as being directed to non-statutory subject

matter. In particular, the rejection asserts that the claims are directed to an abstract idea, which is non-statutory subject matter. It is respectfully submitted that the §112, first paragraph, rejection discussed in MPEP §2107.01(IV) is applicable when a 35 U.S.C. §101 rejection based on lack of utility can be made, but is **not** applicable to a 35 U.S.C. §101 rejection **based on non-statutory subject matter**.

Accordingly, for the reasons set forth above, it is respectfully submitted that the rejection under 35 U.S.C. §112, first paragraph, is improper and should be withdrawn.

#### **Rejections under 35 U.S.C. § 102**

Claims 29-35, 38, 40, 44-61, 62-68, 71, 73, 77-101, 107-108, 112-125 and 128 were rejected under 35 U.S.C. §102(b) as being anticipated by **Bentley et al.**, “Conceptual Evolutionary Design By a Genetic Algorithm.” Claims 104 and 105 were rejected under 35 U.S.C. §102(b) as being anticipated by **Jackson et al.**, “The Use of Animation to Explain Genetic Algorithms.” For the reasons set forth in detail below, these rejections, to the extent they are considered to apply to the amended claims, are respectfully traversed.

Initially, it is noted that the independent claims have been amended to clarify the present invention. More specifically, independent claims 29, 62, 95 and 128 have been amended to clarify that a selected segment or segments can be modified (e.g., by a user) prior to evolving the parent profile, including evolving the modified segment(s), by the genetic algorithm. Support for these amendments is provided, e.g., in Fig. 2, step 2-3 and in the specification, page 7, lines 2-5; page 9, lines 13-15; page 10, line 3 – page 12, line 14; and page 20, lines 12-16, which describe

that attributes (e.g., length, height, asymmetry, angle) may be modified by a profile editor 4. More particularly, page 20, lines 12-16 describes that an attribute value modified by a user is paid special attention by the genetic algorithm.

**Bentley et al.** discloses a computer implemented genetic design system that is capable of optimizing the shape of any three-dimensional solid object (page 3, col. 2, lines 5-7), and is specifically applied to the design of suitable geometries for various optical prisms. According to **Bentley et al.**, in order to create and optimize the complete shape of a design, the design is represented by a number of non-overlapping primitives that are capable of closely approximating any three-dimensional solid object when the primitives are used in combination (page 4, col. 1, lines 1-23).

Each primitive may vary in size and position (page 4, col. 1, lines 9-10), and every primitive shape requires nine definition parameters to specify its 3D position, width, height, depth and orientation of its clipping plane (page 5, col. 1, lines 5-31). The positions of the primitives are defined independently of each other (page 6, col. 2, lines 2-4). Further, by fixing all parameters specifying depth, two-dimensional designs can be created in addition to three dimensional designs (page 4, col. 1, lines 37-45).

As shown in Fig. 7 and described in section 5.3 of **Bentley et al.** (see page 8), the design system begins with purely random initial designs. In particular, Fig. 7 shows examples of initial two primitive random designs prior to evolution. Figs. 8-13 illustrate prisms after evolution.

**Bentley et al.** also suggest that the genetic design system may take into account fitness values and user specified importance values (page 4, col. 2, lines 26-32).

With respect to independent claims 29, 62, 95 and 128, the Examiner considers the primitives constituting the initial random design to be a selected parent profile representing the shape of a physical structure for design, and considers the respective primitives to correspond to the claimed segments into which the parent profile is divided. Finally, the Examiner considers the evolved prism to correspond to the claimed offspring profile that is evolved from the parent profile by varying a least one dimensional characteristic (i.e., one of the nine definition parameters specifying the 3D position, width, height, depth, etc. of the primitive). See paragraph bridging pages 4 and 5 of Office Action.

As noted above, claims 28, 62, 95 and 128 have been amended to clarify that a selected segment or segments can be modified (e.g., by a user) prior to evolving the parent profile, including evolving the modified segment(s), by the genetic algorithm.

It is respectfully submitted that **Bentley et al.** do not disclose or suggest a system that modifies a segment (primitive) prior to evolving the parent profile including the modified segment.

It is noted that the Examiner asserts that **Bentley et al.** discloses evolving only segments selected by a user (see rejection of claims 55, 88 and 121 on page 11, lines 6-9 of the Office Action). However, the Examiner justifies this rejection by asserting that the user selected starting profile consists of user selected segments that are evolved. **Bentley et al.** do not disclose modifying a segment prior to evolving a profile including the modified segment.

Further, the **Jackson et al.** reference applied against dependent claims 104 and 105 does not disclose or suggest the features recited in amended claim 29.

Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. §102 are respectfully requested.

**Rejections under 35 U.S.C. § 103**

Claims 36, 69 and 102 are rejected under 35 U.S.C. §103 as being unpatentable over *Bentley et al.* in view of *Jones et al.*, "Development and Validation of a Genetic Algorithm for Flexible Docking." Claims 37, 70 and 103 are rejected under 35 U.S.C. §103 as being unpatentable over *Bentley et al.* in view of *Renner*, "Geometric Optimization with Genetic Algorithms." Claims 39, 72 and 106 are rejected under 35 U.S.C. §103 as being unpatentable over *Bentley et al.* in view of *Faccenda et al.*, "A Combined Simulation/Optimization Approach To Process Plant Design." Claims 41-42, 74-75, 108 and 109-110 are rejected under 35 U.S.C. §103 as being unpatentable over *Bentley et al.* in view of *Bedwell et al.*, "Artificial Evolution of Algebraic Surfaces."

Each of the claims rejected under §103 are dependent claims. The features recited in the dependent claims rejected under §103 have each been rejected over *Bentley et al.* combined with various other references. However, it is respectfully submitted that none of the references combined with *Bentley et al.* alleviate the deficiencies of *Bentley et al.* discussed above. Accordingly, each of the dependent claims distinguishes over the combinations of references for the same reasons discussed above with respect to the independent claims.

Accordingly, reconsideration and withdrawal of the rejections under §103 are respectfully requested.

Application No. 10/649,936  
Art Unit: 2121

Amendment under 37 C.F.R. §1.111  
Attorney Docket No.: 991334A

**CONCLUSION**

In view of the foregoing amendments and accompanying remarks, it is submitted that all pending claims are in condition for allowance. A prompt and favorable reconsideration of the rejection and an indication of allowability of all pending claims are earnestly solicited.

If the Examiner believes that there are issues remaining to be resolved in this application, the Examiner is invited to contact the undersigned attorney at the telephone number indicated below to arrange for an interview to expedite and complete prosecution of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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